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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,466	04/02/2001	Hiroki Ooi	837.1968	8983

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EXAMINER	
CHAN, ALEX H	

ART UNIT	PAPER NUMBER
2633	4

DATE MAILED: 02/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/822,466	OOI ET AL.	
	Examiner	Art Unit	
	Alex H Chan	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 August 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 August 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,877,879 to Naito in view of U.S. Patent No. 6,522,821 B1 to Hirano et al (hereinafter Hirano).

Regarding claims 1 and 7, Naito discloses method comprising the steps of: generating WDM signal light (Fig. 15) by wavelength division multiplexing a plurality of optical signals having different wavelengths (Col. 1, lines 29-31); transmitting said WDM signal light by an optical fiber transmission line (38); and receiving said WDM signal light transmitted by said optical fiber transmission line (via 42); said receiving step comprising the steps of detecting chromatic dispersion related to at least one of said plurality of optical signals (via 40); providing a variable dispersion compensator (44_1 to 44_n) whose chromatic dispersion is controlled so that said detected chromatic dispersion is reduced (Col. 8, line 63-Col. 9, line 3 and Col. 1, line 62-Col. 2, line 4). Naito does not explicitly disclose providing a dispersion slope compensator for compensating dispersion slope.

Hirano discloses a dispersion slope compensator for compensating dispersion slope (e.g. 100 and 200 of Fig. 2A and Col.9, lines 36-50). Accordingly, one of the ordinary skilled in the art would have been motivated to employ a dispersion slope compensator so that the chromatic

dispersion and dispersion slope of the whole optical transmission system can be reduced and the signal distortion be effectively suppressed (Col. 3, lines 10-23, Hirano). Therefore, it would have been obvious to one of artisan from the same endeavor at the time the invention was made to modify the optical transmission system if Naito by incorporating a dispersion slope compensator because this helps to reduce the chromatic dispersion and dispersion slope as well as suppress signal distortion as suggested by Hirano. Also, dispersion slope compensator such as dispersion slope compensation fiber (DSCF) or slope compensating dispersion compensation fiber (SCDCF) is notoriously well known and conventional in the industry. One of artisan could have been motivated to employ such compensator for compensating dispersion slope as known in the art.

Regarding claims 2 and 8, Naito discloses converting at least one of said plurality of optical signals into an electrical signal (via 46_1 to 46_n of Fig, 17) and detecting the power of a frequency component (e.g. frequency modulated by 18 of Fig. 6C) in said electrical signal corresponding to the bit rate of said at least one optical signal (e.g. frequency substantially corresponding to transmission speed or bit rate, Col. 7, lines 1-12).

Regarding claims 3 and 9, Naito discloses providing a linear repeater unit (Col. 1, lines 18-21).

Regarding claims 4 and 10, Naito discloses detecting chromatic dispersion related to at least one of said plurality of optical signals in said linear repeating unit; and providing a variable dispersion compensator whose chromatic dispersion and dispersion slope are controlled so that said detected chromatic dispersion in said linear repeating unit is reduced (via 52_1 to 52_5 of Fig. 17 and Col. 9, lines 25-35).

Regarding claims 5 and 11, Hirano discloses all limitations as disclosed above, and further discloses providing a dispersion slope compensator for compensating dispersion slope in said linear repeating unit (Fig. 2A, Hirano).

Regarding claims 6 and 12, Naito in view of Tanaka discloses all limitations as disclosed above, and further discloses generating step comprises detecting chromatic dispersion related to at least one of said plurality of optical signals (via 2 of Fig. 17, Naito); providing a variable dispersion compensator whose chromatic dispersion is controlled so that said detected chromatic dispersion is reduced (via 6_1 to 6_n of Fig. 17 and Col. 5, lines 37-63, Naito); and providing a dispersion slope compensator for compensating dispersion slope (e.g. via dispersion compensating optical fiber, Col. 9, lines 36-49, Hirano).

3. **Claims 1-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,877,879 to Naito in view of U.S. Patent No. 6,594,428 B1 to Tanaka et al (hereinafter Tanaka).

Regarding claims 1 and 7, Naito discloses method comprising the steps of: generating WDM signal light (Fig. 15) by wavelength division multiplexing a plurality of optical signals having different wavelengths (Col. 1, lines 29-31); transmitting said WDM signal light by an optical fiber transmission line (38); and receiving said WDM signal light transmitted by said optical fiber transmission line (via 42); said receiving step comprising the steps of detecting chromatic dispersion related to at least one of said plurality of optical signals (via 40); providing a variable dispersion compensator (44_1 to 44_n) whose chromatic dispersion is controlled so that said detected chromatic dispersion is reduced (Col. 8, line 63-Col. 9, line 3 and Col. 1, line 62-Col. 2, line 4). Naito does not explicitly disclose providing a dispersion slope compensator for compensating dispersion slope.

Tanaka discloses providing a dispersion slope compensator (via 40 of Fig. 1A) for compensating dispersion slope (Col. 1, lines 36-38 and lines 49-52, Col. 4, line 62-Col. 5, line 2). Accordingly, one of the ordinary skilled in the art would have been motivated to employ a dispersion slope compensator so that accumulated chromatic dispersion can be controlled within a predetermined value (Col. 1, lines 13-16, Tanaka). Therefore, it would have been obvious to one of artisan from the same endeavor at the time the invention was made to modify the optical transmission system if Naito by incorporating a dispersion slope compensator because this helps to control the chromatic dispersion as taught by Tanaka. Also, dispersion slope compensator such as dispersion slope compensation fiber (DSCF) or slope compensating dispersion

compensation fiber (SCDCF) is notoriously well known and conventional in the industry. One of artisan could have been motivated to employ such compensator for compensating dispersion slope as known in the art.

Regarding claims 2 and 8, Naito discloses converting at least one of said plurality of optical signals into an electrical signal (via 46_1 to 46_n of Fig, 17) and detecting the power of a frequency component (e.g. frequency modulated by 18 of Fig. 6C) in said electrical signal corresponding to the bit rate of said at least one optical signal (e.g. frequency substantially corresponding to transmission speed or bit rate, Col. 7, lines 1-12).

Regarding claims 3 and 9, Naito discloses providing a linear repeater unit (Col. 1, lines 18-21).

Regarding claims 4 and 10, Naito discloses detecting chromatic dispersion related to at least one of said plurality of optical signals in said linear repeating unit; and providing a variable dispersion compensator whose chromatic dispersion and dispersion slope are controlled so that said detected chromatic dispersion in said linear repeating unit is reduced (via 52_1 to 52_5 of Fig. 17 and Col. 9, lines 25-35).

Regarding claims 5 and 11, Naito in view of Tanaka discloses all limitations as disclosed above, and further discloses providing a dispersion slope compensator for compensating dispersion slope in said linear repeating unit (Fig. 1A, Tanaka).

Regarding claims 6 and 12, Naito in view of Tanaka discloses all limitations as disclosed above, and further discloses generating step comprises detecting chromatic dispersion related to at least one of said plurality of optical signals (via 2 of Fig. 17, Naito); providing a variable dispersion compensator whose chromatic dispersion is controlled so that said detected chromatic dispersion is reduced (via 6_1 to 6_n of Fig. 17 and Col. 5, lines 37-63, Naito); and providing a dispersion slope compensator for compensating dispersion slope (e.g. via 58 of Fig. 4, Tanaka).

Regarding claim 13, Naito in view of Tanaka discloses all limitations as disclosed in claim 7 above, and further discloses said receiving terminal unit comprising: a dispersion monitor (via 40 of Fig. 17, Naito) for detecting chromatic dispersion related to at least one of said plurality of optical signals; a variable dispersion compensator (44_1 to 44_n of Fig. 17, Naito); and a circuit (combination of 42, 44 and 46 of Fig. 40, Naito or via 52, 72, 74 and 76 of Fig. 9, Tanaka) for controlling the chromatic dispersion and dispersion slope in said variable dispersion compensator so that said detected chromatic dispersion is reduced.

Regarding claim 15, the limitations introduced by claim 15 corresponds to the limitations introduced by claims 7 and 13. The treatment of claims 7 and 13 above reads on the corresponding limitations of claim 15.

4. **Claims 14 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Naito in view of Tanaka as applied to claim 13 above, and further in view of U.S. Patent No. 6,271,945 B1 o Terahara or U.S. Patent No. 5,930,414 to Fishman et al (hereinafter Fishman).

Regarding claims 14 and 16, Naito in view of Tanaka discloses dispersion monitor comprises a converter (46_1 to 46_n of Fig. 17, Naito) for converting at least one of said plurality of optical signals into an electrical signal. Naito in view of Tanaka does not explicitly disclose a bandpass filter for extracting a frequency component in said electrical signal corresponding to the bit rate of said at least one optical signal, and a power sensor for detecting the power of said frequency component.

Terahara discloses a bandpass filter (94 of Fig. 14) for extracting a frequency component in said electrical signal corresponding to the bit rate of said at least one optical signal, and a power sensor (96 of Fig. 14) for detecting the power of said frequency component (Col. 12, lines 5-19). Likewise, Fishman discloses a bandpass filter (65 of Fig. 2) for extracting a frequency component in said electrical signal corresponding to the bit rate of said at least one optical signal, and a power sensor (95 of Fig. 2) for detecting the power of said frequency component (Col. 12, lines 16-24). Accordingly, one of the ordinary skilled in the art would have been motivated to employ a bandpass filter and a power sensor for providing a distortion analyzer for analyzing

signal distortion (Col. 5, lines 56-60). Therefore, it would have been obvious to one of artisan from the same endeavor at the time the invention was made to modify the optical transmission system if Naito in view of Tanaka by incorporating a bandpass filter and a power sensor because this provides a distortion analyzer for analyzing signal distortion as suggested by Fishman.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Eggleton et al is cited to show a dispersion compensator and a spectrum processor for analyzing chromatic dispersion (Fig. 11 and 12). Essiambre is cited to show pre-compensation and post-compensation for compensating chromatic dispersion (Col, 1, lines 27-54). Huber et al is cited to show a electrical bandpass filter coupled with electrical processing circuit for compensating chromatic dispersion (Col. 7, lines 31-46). Gnauck et al is cited to show repeater having dispersion compensators for compensating slope dispersion (abstract). Okuno et al is cited to show a dispersion-compensating module for compensating chromatic dispersion (Fig. 7-9).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex H Chan whose telephone number is (703)305-0340. The examiner can normally be reached on Monday to Friday (8am to 6pm EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alex Chan
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February 19th, 2004

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